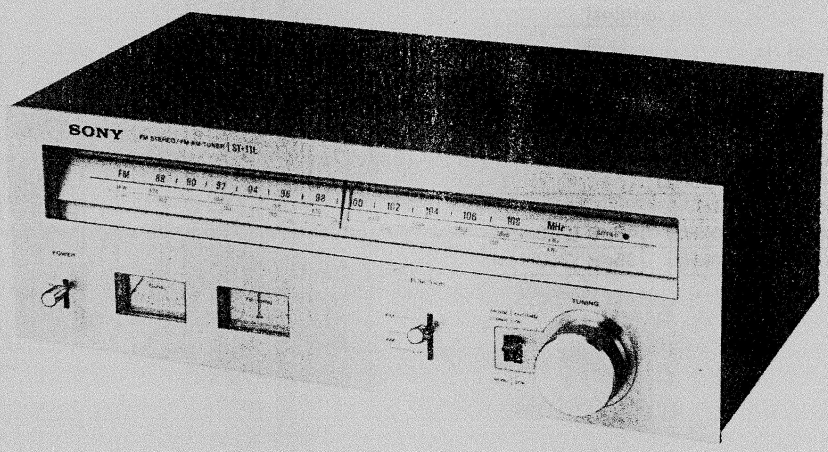
ST-11L

AEP Model



FM STEREO/FM-AM TUNER

SPECIFICATIONS

GENERAL

Power Requirements: 110, 120, 220 or 240V ac adjustable, 50/60Hz.
Power Consumption: 9W
Dimensions: Approx.
406(w) x 145(h) x 245(d) mm
16(w) x 5¾(h) x 9⅝(d) inches
incl. projecting parts and controls
Weight: Approx 3.6 kg, 7 lb 15 oz (net)
4.9 kg, 10 lb 13 oz
(with shipping carton)

FM SECTION

Tuning Range: 87.5–108MHz
Antenna Terminals: 300Ω, balanced
75Ω, unbalanced
Intermediate Frequency: 10.7MHz
Sensitivity at 50dB Quieting: 4.0μV (MONO), new IHF 17.3dBf
45μV (STEREO), new IHF 38.3dBf
Usable Sensitivity: IHF 1.8μV, new IHF 10.3dBf
S/N Ratio: 70dB (MONO)
68dB (STEREO)

Harmonic Distortion: At 100Hz
0.2% (MONO)
0.3% (STEREO)
At 1kHz
0.2% (MONO)
0.3% (STEREO)
At 10kHz
0.2% (MONO)
0.5% (STEREO)
IM Distortion: 0.2% (MONO)
0.3% (STEREO)
Separation: 35dB at 100Hz
45dB at 1kHz
35dB at 10kHz
Frequency Response: 30Hz–15kHz $^{+0.5}_{-2.0}$ dB
Alternate Channel Selectivity: 55dB
Capture Ratio: 1.0dB
AM Suppression Ratio: 50dB
Image Response Ratio: 45dB
IF Response Ratio: 90dB
Spurious Response Ratio: 75dB
RF Intermodulation: 60dB
Sub-carrier Product Ratio: 30dB
Muting Threshold: Approx. 3μV
Output Level: 750mV, 5kΩ
(at 1kHz, 100% modulation)

– Continued on page 2 –

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SONY

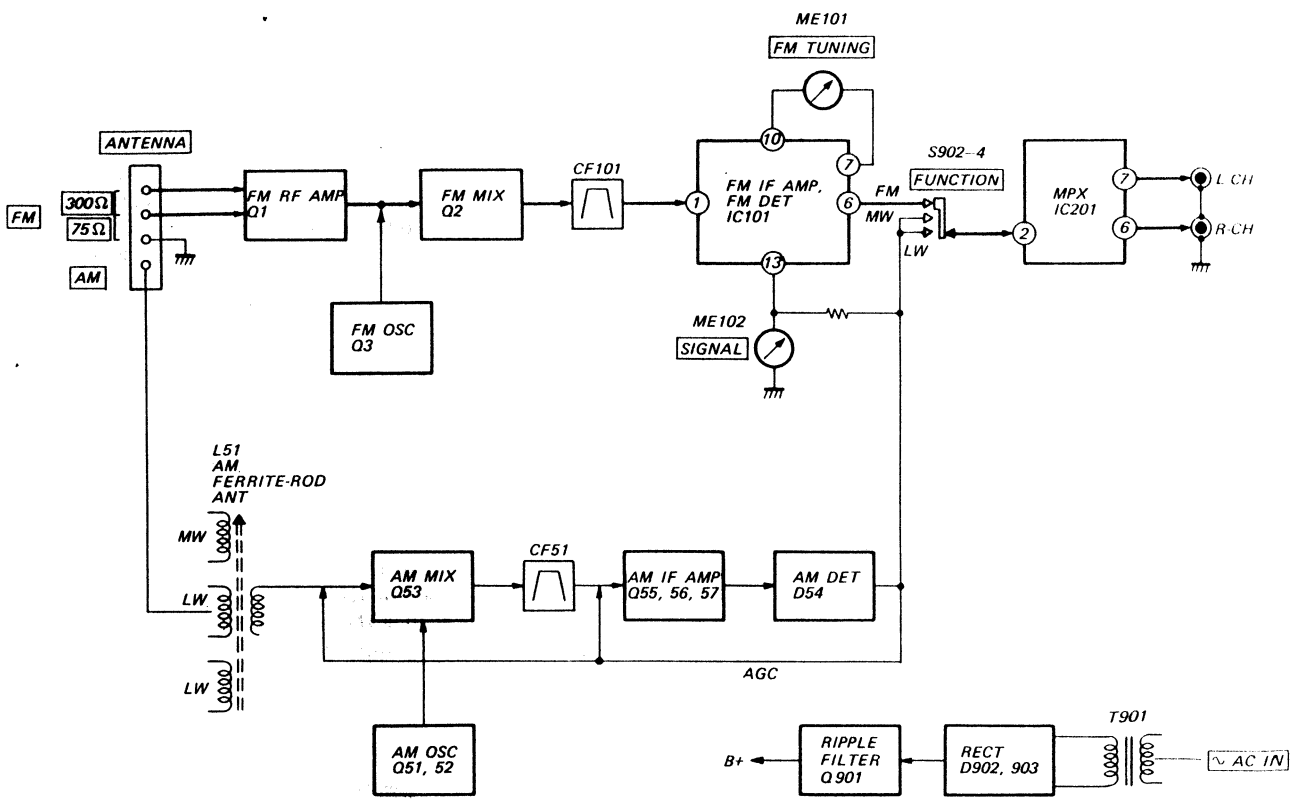
SERVICE MANUAL

MW, LW SECTION

	MW	LW
Tuning Range	530—1,605kHz	150—350kHz
Antenna	Built-in ferrite rod antenna External antenna terminal	
Intermediate Frequency	455kHz	
Usable Sensitivity	48dB/m, built-in antenna(1,000kHz)	56dB/m, built-in antenna(240kHz)
S/N Ratio	50dB (50mV/m)	48dB (50mV/m)
Harmonic Distortion	0.5% (50mV/m, 400Hz)	
Selectivity	45dB (10kHz)	
Image Response Ratio	40dB (1,000kHz)	45dB (240kHz)
IF Response Ratio	35dB (1,000kHz)	35dB (240kHz)

SECTION 1
OUTLINE

1-1. BLOCK DIAGRAM

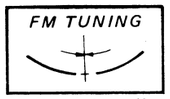


SECTION 3
DISASSEMBLY

FM DISCRIMINATOR ALIGNMENT 1

Procedure:

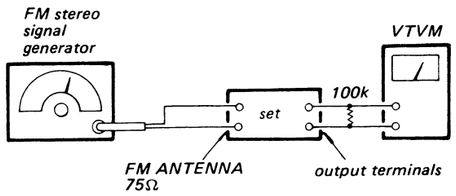
1. Connect a 300Ω resistor across ANTENNA FM 300Ω terminals.
2. Detune the set.
3. Turn the core (primary side) of IF101 for null-point reading on the FM TUNING meter.



Null-point reading

FM STEREO SEPARATION ADJUSTMENT

Procedure:



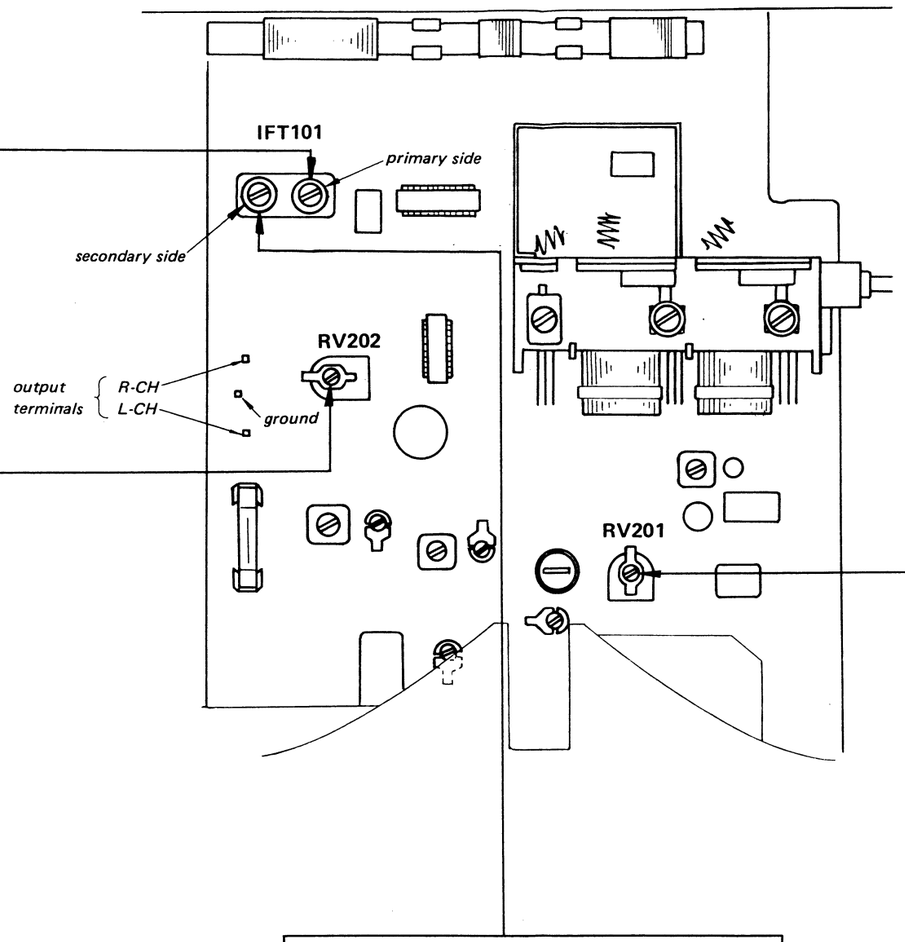
Carrier frequency: 98 MHz
Output level: 1 mV (60 dB)
Mode: Stereo
Modulation:
Audio (400 Hz): 33.75 kHz deviation (45%)
Pilot (19 kHz): 7.5 kHz deviation (10%)
Sub channel (38 kHz): 33.75 kHz deviation (45%)

FUNCTION Switch: FM STEREO

FM stereo signal generator output channel	VTVM connection	VTVM reading
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RV202 resistor for minimum reading.
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RV202 resistor for minimum reading.

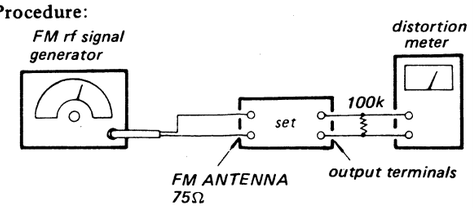
Stereo separation: Ⓐ − Ⓑ , Ⓒ − Ⓓ

The difference between separations Ⓐ → Ⓑ and Ⓒ → Ⓓ are to be equal.



FM DISCRIMINATOR ALIGNMENT 2

Procedure:



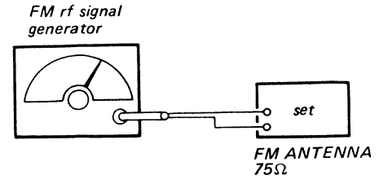
Carrier frequency: 10.7 MHz
Modulation: 400 Hz, 100%
Output level: 1mV (60dB)

1. Set FUNCTION switch to FM MONO.
2. Turn the core (secondary side) of IFT101 for a minimum distortion reading on the distortion meter.

MPX ADJUSTMENT

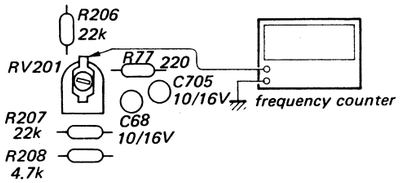
A) Regular Method

Procedure:



Carrier frequency: 98 MHz
Modulation: no modulation

Output level: 1 mV (60 dB)

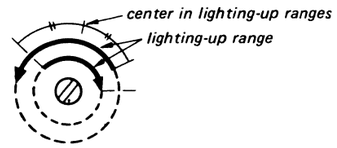


1. Tune the set to 98 MHz.
2. Adjust RV201 for 76kHz±400Hz on the counter.

B) Simple Method

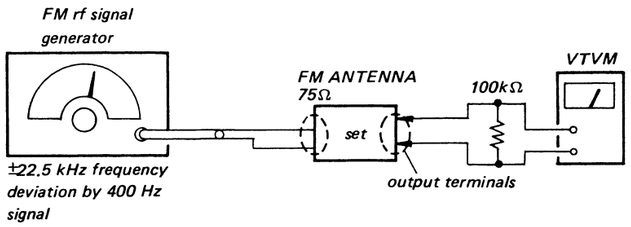
Procedure:

1. Tune the set to the FM stereo broadcasting signal.
2. Turn RV201 clockwise or counterclockwise and memorize the lighting-up range of STEREO lamp.
3. Secure RV201 at the center in lighting-up range of both turns as shown below.



FM SECTION

FUNCTION Switch: FW



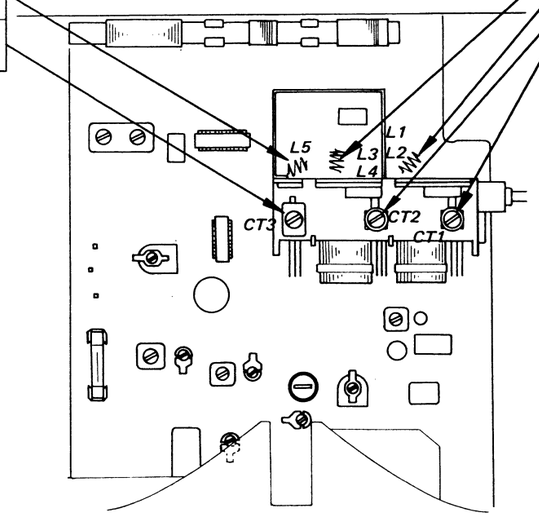
- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

FM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VTVM.	
87.1 Mhz (87.5 MHz)	L5
108.5 MHz (108 MHz)	CT3

( ): in West Germany

FM TRACKING ADJUSTMENT	
Adjust for maximum reading on VTVM.	
L3, L4	87.1 MHz
L1, L2	(87.5 MHz)
CT2	108.4 MHz
CT1	(108 MHz)

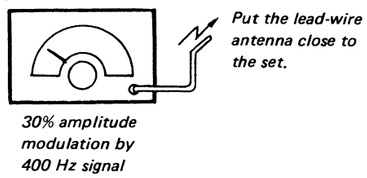
( ): in West Germany



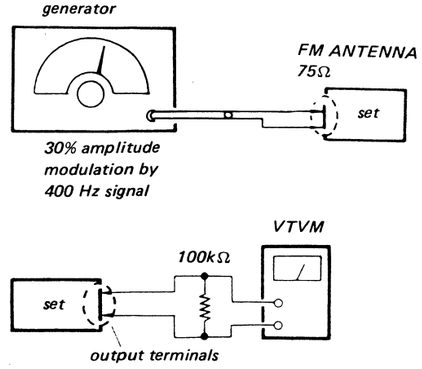
MW, LW SECTION

FUNCTION Switch: MW or LW

- **MW, LW FREQUENCY COVERAGE AND TRACKING 1 ADJUSTMENTS.**
  LW antenna selector: BUILT-IN ANT



- **LW TRACKING 2 ADJUSTMENT.**
  LW antenna selector: EXT ANT



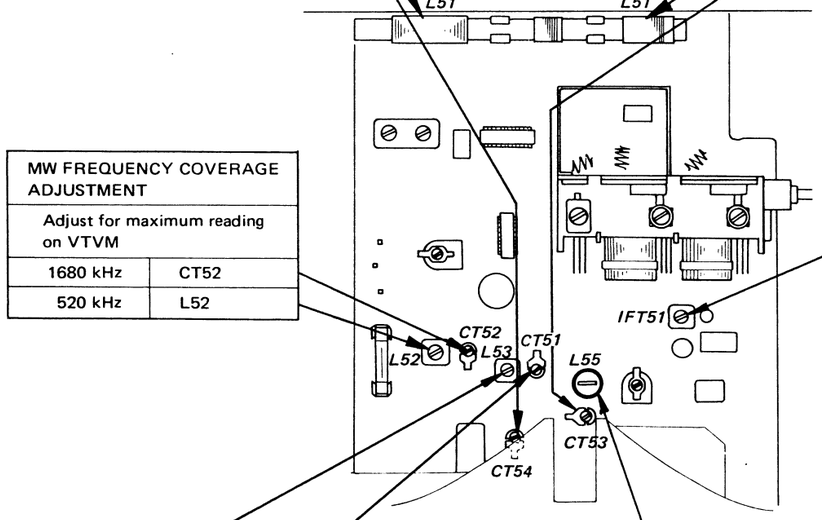
- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

MW TRACKING ADJUSTMENT	
Adjust for maximum reading on VTVM	
620 kHz	L51
1400 kHz	CT54

LW TRACKING 1 ADJUSTMENT	
1) LW antenna selector: BUILT-IN ANT position.	
2) Adjust for maximum reading on VTVM.	
L51	170 kHz
CT53	310 kHz

MW FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VTVM	
1680 kHz	CT52
520 kHz	L52

AM IF ADJUSTMENT	
Adjust for maximum reading on VTVM.	
IFT51	455 kHz



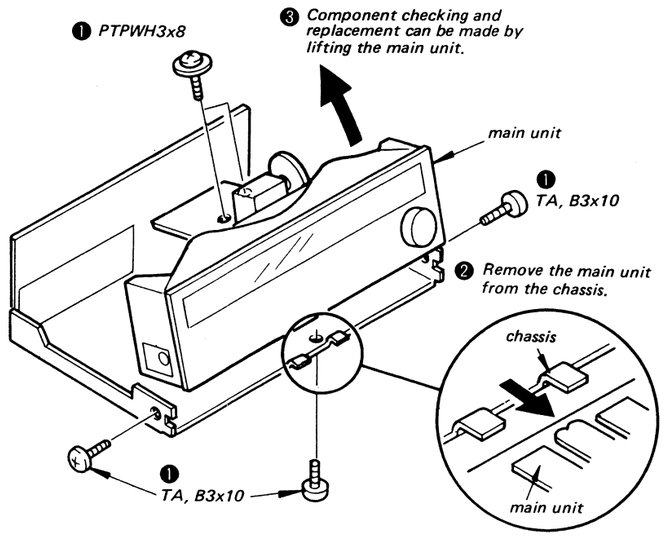
L53	CT51
145 kHz	365 kHz
Adjust for maximum reading on VTVM.	
LW FREQUENCY COVERAGE ADJUSTMENT	

LW TRACKING 2 ADJUSTMENT	
1) LW antenna selector: EXT. ANT position	
2) Adjust for maximum reading on VTVM.	
L55	170 kHz

SECTION 2
REMOVAL

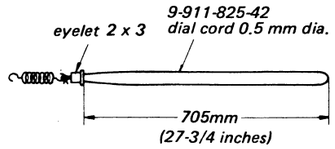
2-1. MAIN UNIT REMOVAL

Remove the case first and remove the parts in the numerical order as shown below.


❶ PTPWH3x8
❸ Component checking and replacement can be made by lifting the main unit.
main unit
❶ TA, B3x10
❷ Remove the main unit from the chassis.
chassis
❶ TA, B3x10
main unit

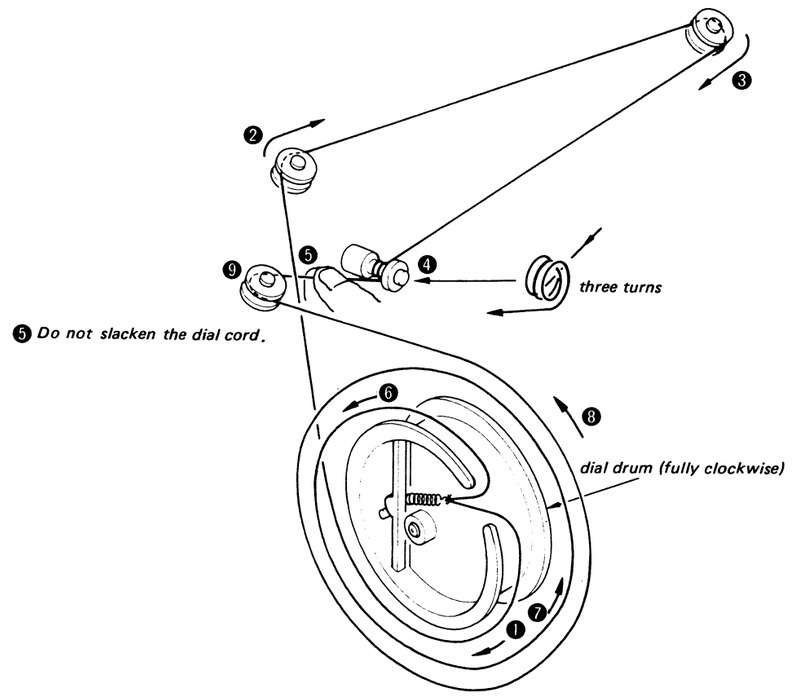
2-2. DIAL CORD STRINGING

1. Dial Cord Preparation



2. Dial Cord Stringing

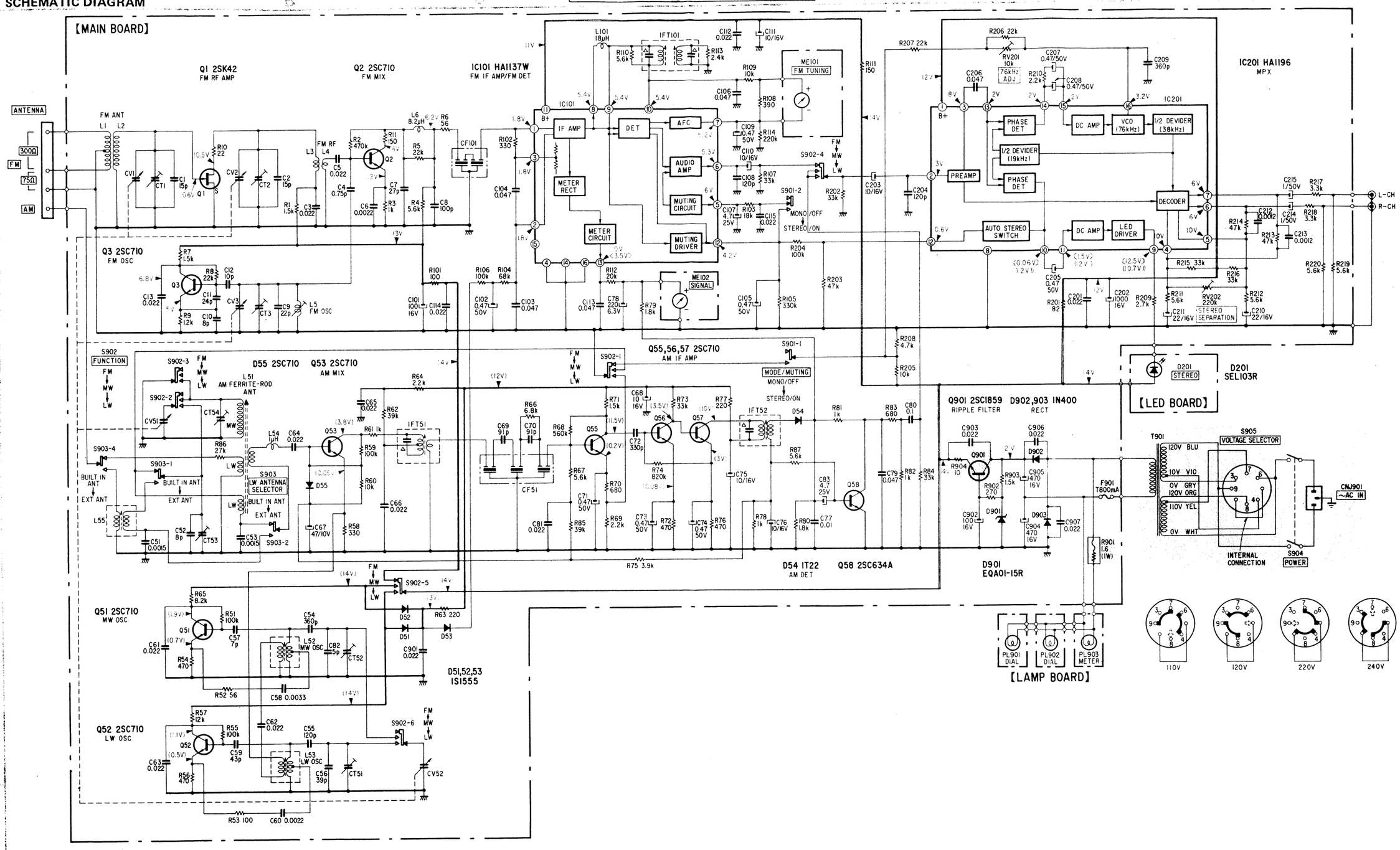
❶ Set the shaft of the tuning capacitor to full-clockwise position.



3. Dial Pointer Setting

Receive a broadcasting station and set the dial pointer on the dial scale.

4-2. SCHEMATIC DIAGRAM



Note:

- All capacitors are in μF unless otherwise noted. pF = μμF 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted.
  kΩ = 1000Ω, MΩ = 1000kΩ
- ⊣WV⊢: fusible resistor.
- △: internal component.
- Transistor is used for D55.
- ——: B+ bus.
- ▭: Panel designation.
- ⏚: direct connection to points marked on the chassis.
- Voltage variations may be noted due to normal production tolerances.
- ▭: adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under FM detuned conditions with a VOM (20 kΩ/V).
  ( ): AM detuned.
  [ ]: D201 turns OFF.
  < >: FM tuned.
  (( )): D201 turns ON.

- Switch

Ref. No.	Switch	Position
S901-1, 2	MODE/MUTING	MONO/OFF
S902-1 to 902-6	FUNCTION	FM
S903-1,2,4	LW ANTENNA SELECTOR	BUILT IN ANT
S904	POWER	OFF
S905	VOLTAGE SELECTOR	—

Note: The components identified by shading are critical for safety. Replace only with part number specified.

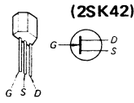
SECTION 4
DIAGRAMS

4-1. MOUNTING DIAGRAM

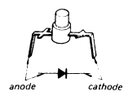
– Conductor Side –

Replacement Semiconductors
For replacement, use semiconductors except in ( ).

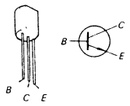
Q1 : 2SK42-4 (2SK42)



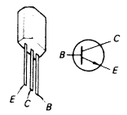
D201 : SEL103R



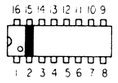
Q2, 3
51~53: 2SC710
55~57



Q58 : 2SC634A

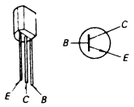


IC101 : HA1137W

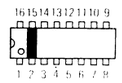


(Top view)

Q901 : 2SC1859

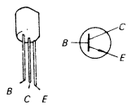


IC201 : HA1196

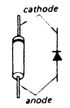


(Top view)

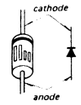
D55 : 2SC710



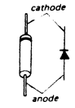
D54 : 1T22A (1T22)



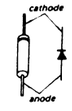
D901 : EQB01-15 (EQA01-15R)

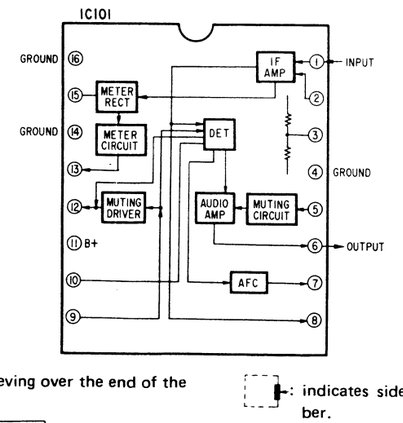


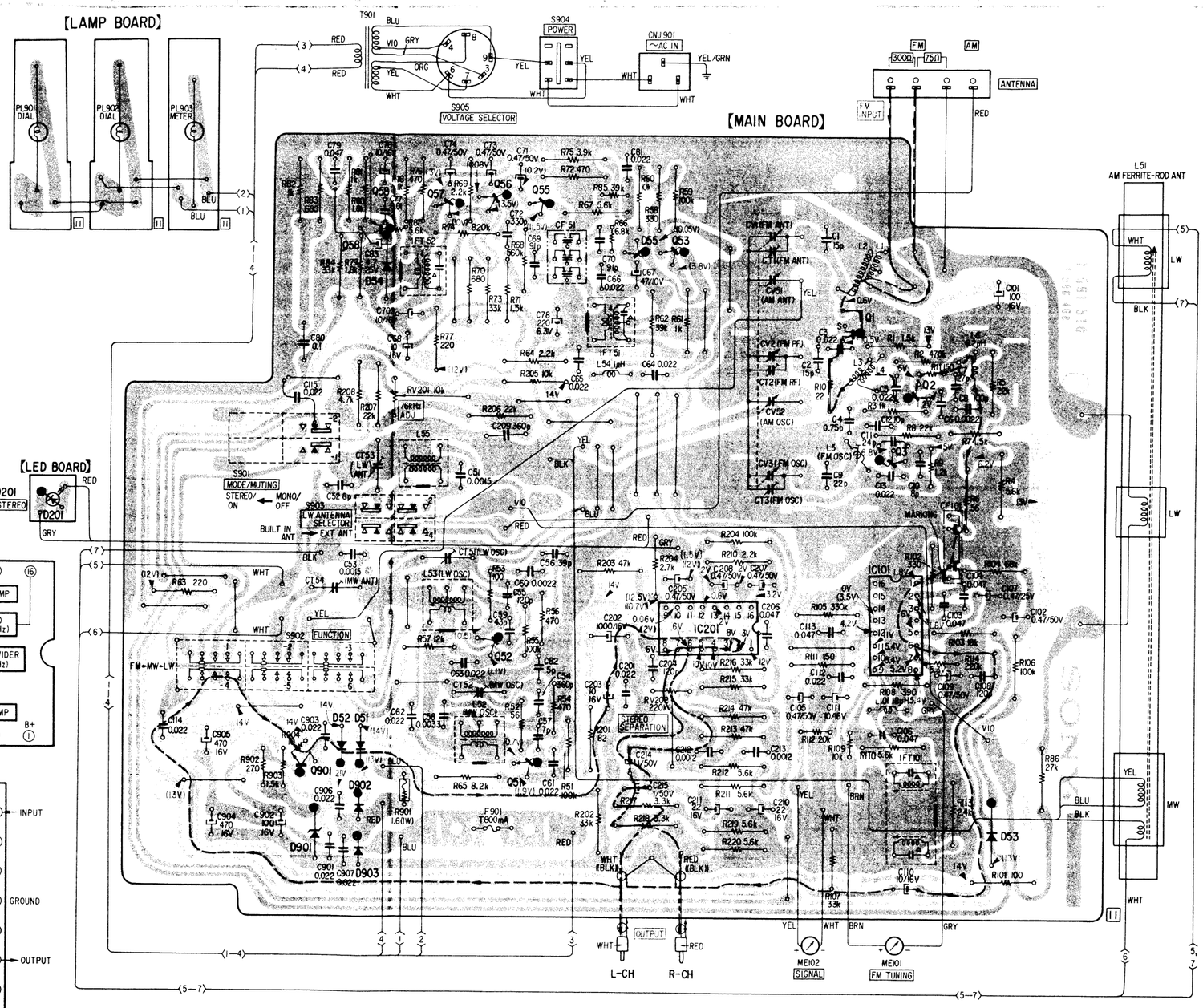
D902
D903 : 10E2 (1N400)



D51,
52,53 : 1S1555

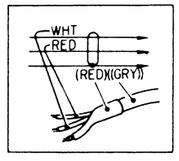






Q, IC	D
57 56 55	
58 53	54 55
1	
2	
3	201
52 IC201 IC101	
901 51	5251 902
901	903
	53

- Color code of sleeving over the end of the jacket.



: indicates side identified with part number.

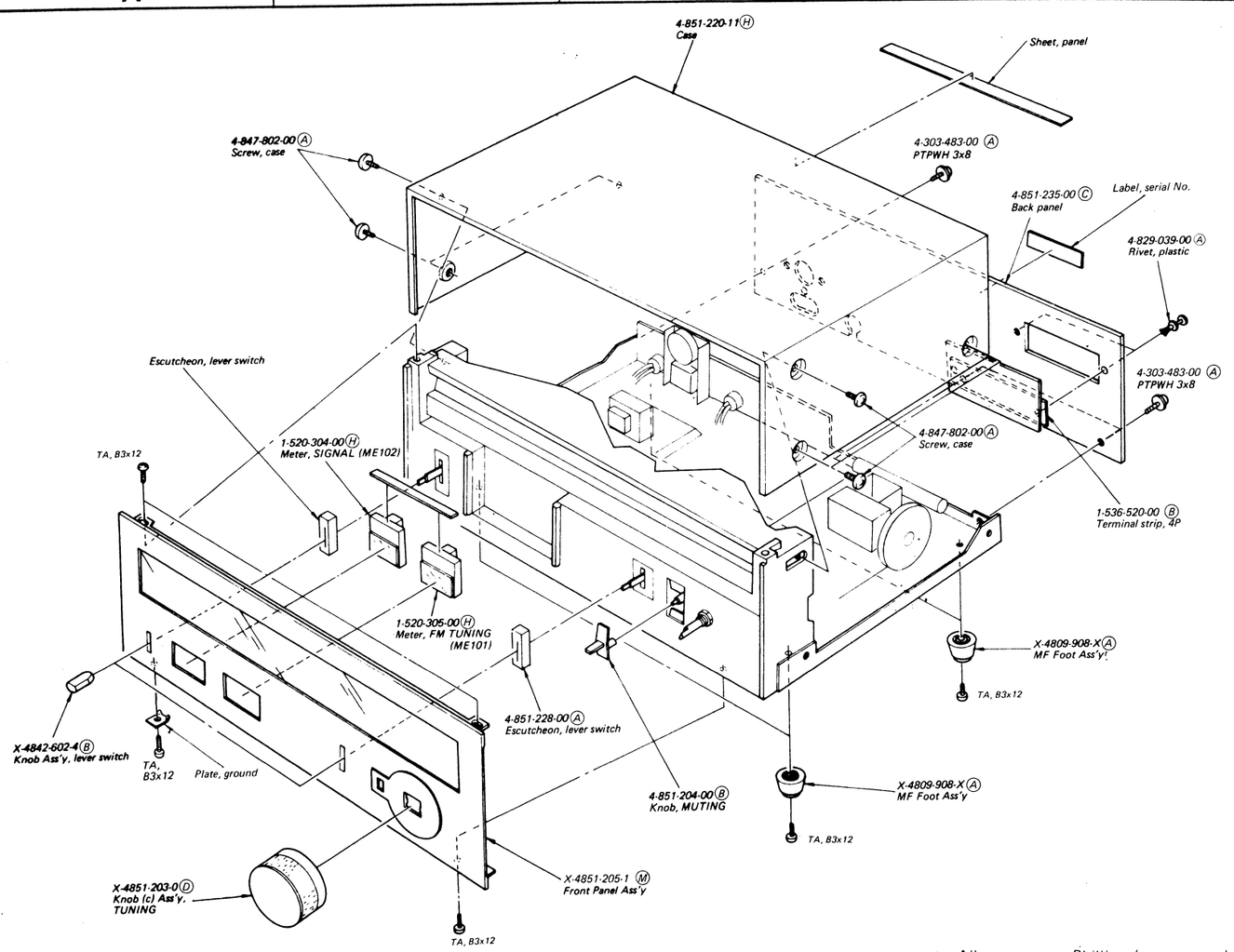
: B+ pattern

: signal path { : L-CH / : R-CH }

: Voltages are dc with respect to ground unless otherwise noted.

: Readings are taken under FM detuned conditions with a VOM (20 kΩ/V).
( ) : AM detuned.
[ ] : D201 turns OFF.
< > : FM tuned.
(( )) : D201 turns ON.

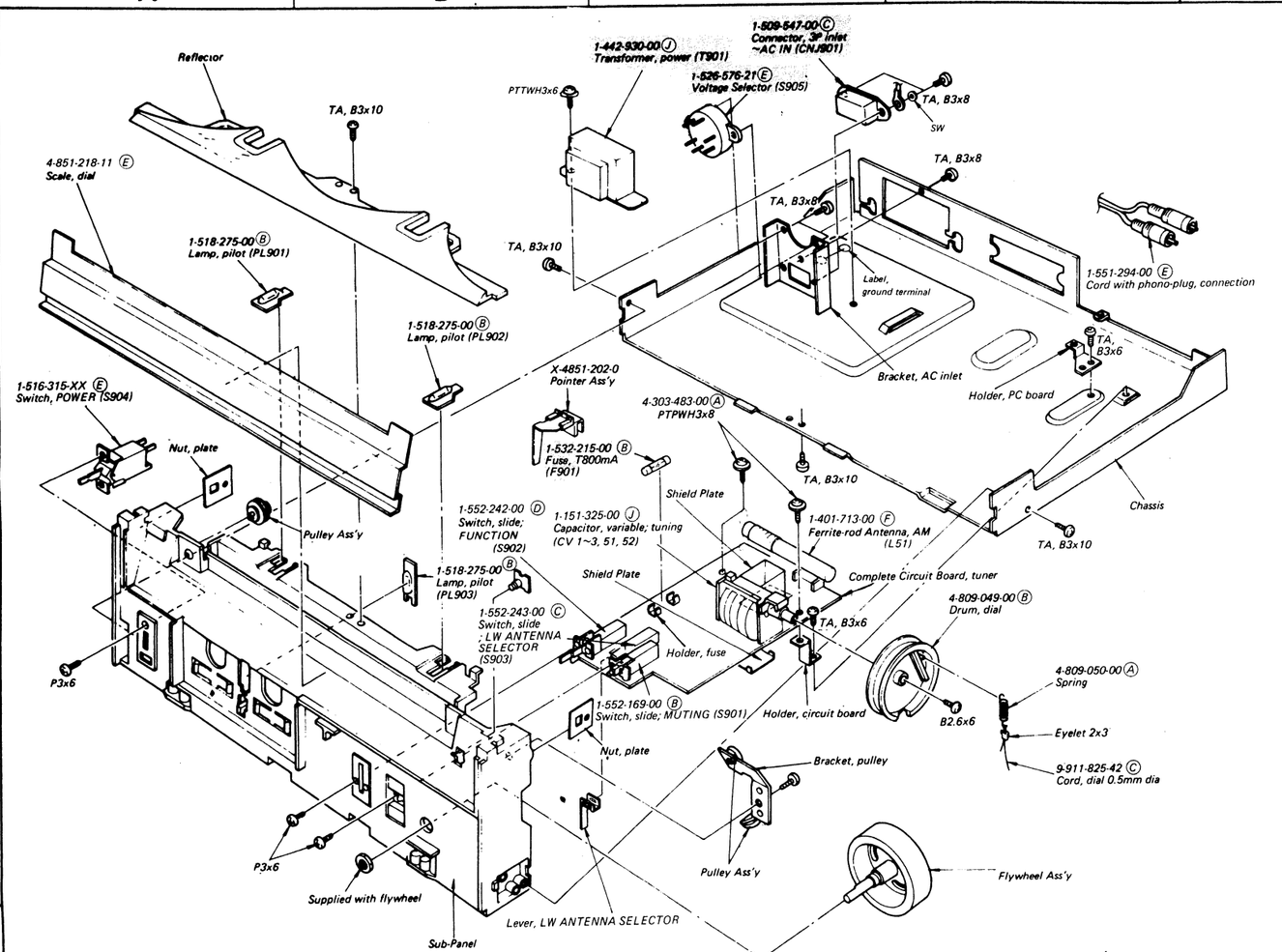
5-1.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters ((A) to (Z)) are applicable to European models only.

5-2.



Note: The components identified by shading are critical for safety. Replace only with part number specified.

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters ((A) to (Z)) are applicable to European models only.

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	*Part No.*	*Description*		
C78	1-121-419-11	Ⓑ 220	6.3V	elect
C79	1-161-021-11	Ⓐ 0.047	(boundary layer)	
C80	1-101-797-11	Ⓐ 0.1		
C81	1-101-924-11	Ⓐ 0.022		
C82	1-102-281-11	Ⓐ 5p		
C83	1-121-395-11	Ⓐ 4.7	25V	elect
C101	1-121-415-11	Ⓑ 100	16V	elect
C102	1-121-726-11	Ⓐ 0.47	50V	elect
C103, 104	1-101-925-11	Ⓐ 0.047		
C105	1-121-726-11	Ⓐ 0.47	50V	elect
C106	1-101-925-11	Ⓐ 0.047		
C107	1-121-395-11	Ⓐ 4.7	25V	elect
C108	1-102-816-11	Ⓐ 120p		
C109	1-121-726-11	Ⓐ 0.47	50V	elect
C110, 111	1-121-651-11	Ⓐ 10	16V	elect
C112	1-101-924-11	Ⓐ 0.022		
C113	1-101-925-11	Ⓐ 0.047		
C114, 115	1-101-924-11	Ⓐ 0.022		
C201	1-101-924-11	Ⓐ 0.022		
C202	1-121-245-11	Ⓑ 1000	16V	elect
C203	1-121-651-11	Ⓐ 10	16V	elect
C204	1-102-816-11	Ⓐ 120p		
C205	1-121-726-11	Ⓐ 0.47	50V	elect
C206	1-161-021-11	Ⓐ 0.047	(boundary layer)	
C207, 208	1-121-726-11	Ⓐ 0.47	50V	elect
C209	1-103-714-11	Ⓐ 360p	polystyrol	
C210, 211	1-121-479-11	Ⓐ 22	16V	elect
C212, 213	1-161-002-11	Ⓐ 0.0012	(boundary layer)	
C214, 215	1-121-391-11	Ⓐ 1	50V	elect
C901	1-101-924-11	Ⓐ 0.022		
C902	1-121-415-11	Ⓑ 100	16V	elect
C903	1-101-924-11	Ⓐ 0.022		
C904, 905	1-121-426-11	Ⓑ 470	16V	elect
C906, 907	1-101-924-11	Ⓐ 0.022		
CT51—54	1-141-138-XX	Ⓑ Trimmer		
CV1—3	1-151-325-00	Ⓙ Tuning		
CV51, 52	1-151-325-00	Ⓙ Tuning		

RESISTORS

All resistors are in ohms. Common ¼W carbon resistors are omitted. Check schematic diagram for values.

R901	1-213-041-11	Ⓐ 1.6 1W fusible
RV201	1-222-645-XX	Ⓑ 10K, adjustable
RV202	1-222-649-XX	Ⓑ 220K, adjustable

SWITCHES

S901	1-552-169-00	Ⓑ Slide, MODE/MUTING
S902	1-552-242-00	Ⓓ Slide, FUNCTION
S903	1-552-243-00	Ⓒ Slide, LW ANTENNA SELECTOR
S904	1-516-315-XX	Ⓔ Lever, POWER
S905	1-526-576-21	Ⓔ Voltage Selector

JACKS

CNJ001	1-536-520-00	Ⓑ Terminal, 4P
CNJ901	1-509-547-00	Ⓒ Connector, 3P inlet; AC IN

FUSE

F901	1-532-215-00	Ⓑ T800mA

MISCELLANEOUS

CF51	1-527-305-00	Ⓓ Filter
CF101	1-231-304-00	Ⓓ Filter, 10.7MHz
ME101	1-520-305-00	Ⓗ Meter, FM TUNING
ME102	1-520-304-00	Ⓗ Meter, SIGNAL
PL901 ~ 903	1-518-275-00	Ⓑ Pilot Lamp
	1-501-161-00	Ⓕ Feeder Antenna
	1-551-294-00	Ⓔ Cord with phono-plug, connection

Note: The components identified by shading are critical for safety. Replace only with part number specified.

SECTION 6
ELECTRICAL PARTS LIST

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	*Part No.*	*Description*
		SEMICONDUCTORS
		Transistors
⇒Q1		Ⓒ2SK42-4
Q2, 3		Ⓑ2SC710
Q51-53		Ⓑ2SC710
Q55-57		Ⓑ2SC710
Q58		Ⓑ2SC634A
Q901		**Ⓑ2SC1859**
		ICs
IC101		ⒽHA1137W
IC201		ⒼHA1196
		Diodes
D51-53		Ⓑ1S1555
⇒D54		Ⓑ1T22A
D55		Ⓑ2SC710
D201		ⒷSEL103R
⇒ **D901**		**ⒷEQB01-15**
⇒ **D902, 903**		**Ⓑ10E2**
		COILS
L1	1-420-875-00	ⒶCoreless
L4	1-405-612-00	ⒶFM RF
L6	1-407-692-00	Ⓐ8.20μH, microinductor
L51	1-401-713-00	ⒻFerrite-rod Antenna
L52	1-405-732-00	ⒷMW OSC
L53	1-405-731-00	ⒷLW OSC
L54	1-407-178-XX	Ⓐ1μH, microinductor
L55	1-401-676-00	ⒷLW EXT ANTENNA
L101	1-407-741-00	Ⓑ18μH, microinductor
IFT051	1-404-089-00	ⒸIFT
IFT052	1-404-064-00	ⒷAM Detector
IFT101	1-404-011-00	ⒸFM Discriminator

⇒: Due to standardization, interchangeable replacemer may be substituted for parts specified in the diagrams.

Ref. No.	*Part No.*	*Description*
		TRANSFORMER
T901	**1-442-930-00**	**Power**
		CAPACITORS

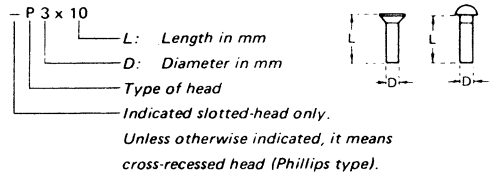
All capacitors are in μF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics. pF = μμF, elect = electrolytic

C1, 2	1-102-951-11	Ⓐ15p		
C3	1-101-924-11	Ⓐ0.022		
C4	1-101-586-11	Ⓐ0.75p		
C5	1-101-924-11	Ⓐ0.022		
C6	1-102-121-11	Ⓐ0.0022		
C7	1-102-961-11	Ⓐ27p		
C8	1-102-973-11	Ⓐ100p		
C9	1-102-600-11	Ⓐ22p		
C10	1-102-684-11	Ⓐ8p		
C11	1-102-601-11	Ⓐ24p		
C12	1-102-858-11	Ⓐ10p		
C13	1-101-924-11	Ⓐ0.022		
C51	1-103-729-11	Ⓐ0.0015		polystyrol
C52	1-102-945-11	Ⓐ8p		
C53	1-103-729-11	Ⓐ0.0015		polystyrol
C54	1-103-714-11	Ⓐ360p		polystyrol
C55	1-103-703-11	Ⓐ120p		polystyrol
C56	1-102-965-11	Ⓐ39p		
C57	1-102-944-11	Ⓐ7p		
C58	1-102-123-11	Ⓐ0.0033		
C59	1-102-966-11	Ⓐ43p		
C60	1-102-121-11	Ⓐ0.0022		
C61 ~ C66	1-101-924-11	Ⓐ0.022		
C67	1-121-352-11	Ⓐ47	10V	elect
C68	1-121-651-11	Ⓐ10	16V	elect
C69, 70	1-102-972-11	Ⓐ91p		
C71	1-121-726-11	Ⓐ0.47	50V	elect
C72	1-102-820-11	Ⓐ330p		
C73, 74	1-121-726-11	Ⓐ0.47	50V	elect
C75, 76	1-121-651-11	Ⓐ10	16V	elect
C77	1-161-013-11	Ⓐ0.01	(boundary layer)	

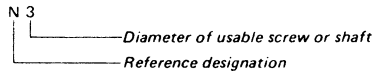
Note: The components identified by shading are critical for safety. Replace only with part number specified.

HARDWARE NOMENCLATURE

Screw:

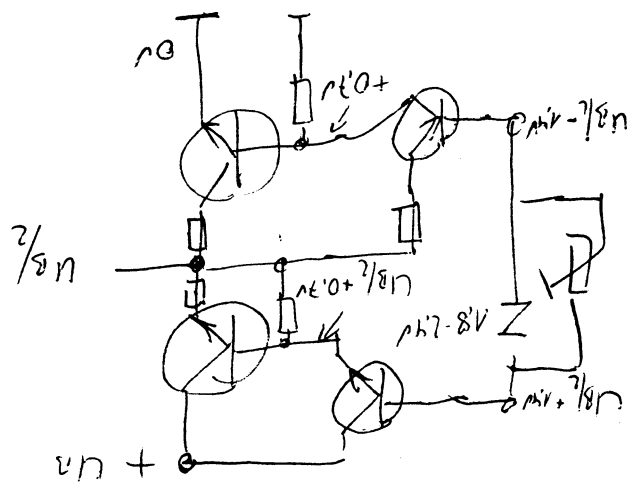


Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	



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Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	*Part No.*	*Description*
		ACCESSORIES & PACKING MATERIALS
	3-701-630-00	Ⓐ Bag, plastic
	3-770-341-11	Ⓔ Manual, instruction
	4-851-242-00	Ⓔ Carton
	4-851-243-00	Ⓑ Cushion
	4-891-037-00	Ⓐ Bag, plastic